

What is claimed is:

1 1. A semiconductor device comprising:
2 a substrate in which an internal wire is formed;
3 at least one semiconductor chip mounted on the substrate;
4 a heat spreader which is used for externally radiating heat
5 from the semiconductor chip; and
6 a heat conductive material having flexibility, which is
7 provided between the surface opposite to surfaces of the
8 semiconductor chip near the substrate and the undersurface of
9 the heat spreader in accordance with the height of the space
10 therebetween, and has a plurality of bumps at least on the
11 semiconductor chip side surface.

1 2. The semiconductor device according to Claim 1, further
2 comprising resin, which is used for sealing the substrate, the
3 semiconductor chip, the heat conductive material, and the heat
4 spreader.

1 3. The semiconductor device according to Claim 1, wherein the
2 heat conductive material is a curved thin metal intermediate
3 plate with a plurality of bumps on the upper- and the under-surface
4 thereof, which is processed into a wave shape having a gradual
5 curvature.

1 4. The semiconductor device according to Claim 3, wherein the
2 plurality of bumps of the curved intermediate plate is formed
3 by deforming or processing the curved intermediate plate.

1 5. The semiconductor device according to Claim 3, wherein the
2 curved intermediate plate is made of copper as the principle
3 component.

1 6. The semiconductor device according to Claim 1, wherein the
2 heat conductive material is a cylindrical metal ring with a
3 plurality of bumps provided on a surface thereof.

1 7. The semiconductor device according to Claim 1, wherein the
2 heat conductive material uses a portion of the heat spreader
3 corresponding to a position of the semiconductor chip as a flat
4 spring and a plurality of bumps are formed on the undersurface
5 thereof.

1 8. A semiconductor device comprising: N
2 a substrate in which an internal wire is formed;
3 a plurality of semiconductor chips mounted on the substrate;
4 a heat spreader which is used for externally radiating heat
5 from the plurality of semiconductor chips; and
6 a heat conductive material having flexibility, which is
7 provided between the surfaces opposite to surfaces of the
8 plurality of semiconductor chips near the substrate and the
9 undersurface of the heat spreader in accordance with the height
10 of the space therebetween, and has a plurality of bumps at least
11 on the semiconductor chip side surface.

1 9. The semiconductor device according to Claim 8, further
2 comprising resin, which is used for sealing the substrate, the
3 plurality of semiconductor chips, the heat conductive material,
4 and the heat spreader.

1 10. The semiconductor device according to Claim 8, wherein the
2 heat conductive material is a curved thin metal intermediate
3 plate with a plurality of bumps on the upper- and the under-surface
4 thereof, which is processed into a wave shape having a gradual
5 curvature.

1 11. The semiconductor device according to Claim 10, wherein the
2 plurality of bumps of the curved intermediate plate is formed
3 by deforming or processing the curved intermediate plate.

1 12. The semiconductor device according to Claim 10, wherein the
2 curved intermediate plate is made of copper as the principle
3 component.

1 13. The semiconductor device according to Claim 8, wherein the
2 heat conductive material is a cylindrical metal ring with a
3 plurality of bumps provided on a surface thereof.

1 14. The semiconductor device according to Claim 8, wherein the
2 heat conductive material uses a portion of the heat spreader
3 corresponding to a position of the plurality of semiconductor

4 chips as a flat spring and a plurality of bumps are formed on
5 the undersurface thereof.